

CHAPTER 5

WATER DISTRIBUTION SYSTEM

5.0 GENERAL

- 5.0.1 All work performed and materials supplied shall conform to the latest edition of Standard Specifications for Sewer and Water Construction in Wisconsin, unless otherwise called for in the plans, specifications or special provisions of the City of Franklin.
- 5.0.2 Any substitutions or equals not specified must be approved prior to final approval of plans and specifications.
- 5.0.3 The City requires a full-time inspector on the job site during pipe unloading and on the job site during construction of the water main and water laterals. The contractor responsible for the construction of the water main and water laterals is also responsible for notifying the City as per the notification policy of the City of Franklin. Contractor shall supply material certification sheets prior to construction.
- 5.0.4 All buried metal components shall be double-wrapped with polyethylene wrap meeting the requirements of Chapter 8.21.0. Installation of the wrap shall conform to Section 4.4.4.
- 5.0.5 All buried fittings shall be accurately located by the contractor. The contractor will work with the assistance of the City's site representative to accurately install a location marker. The locating marker shall be a 2 foot long metal #4 rebar or a wooden 2" x 4" placed precisely over the fitting after backfilling and compaction operations are completed. At the completion of the water main and water lateral installation for the project, the contractor will be responsible for contacting the city representative and requesting the collection of the GPS data. The locating marker is the responsibility of the contractor and must be protected from removal or disturbance until a City representative collects the location of the marker using a GPS. If the locating marker is lost or damaged, the contractor shall excavate and expose the fitting to allow for accurate relocating. The cost of relocating the marker including the excavating shall be the sole responsibility of the contractor.

5.1 WATER MAIN

- 5.1.1 Ductile Iron (DI) pipe shall be thickness Class 52, cement mortar lined, push-on-joint and shall meet all the requirements set forth in Chapter 6.18.0 of the Wisconsin Standard Specifications.

Polyvinyl Chloride (PVC) water pipe shall conform to the requirements of A.W.W.A. C-900 pressure Class 150 for pipe through 12-inch diameter ratio and C-905 or (3) pressure Class 235 for 16-inch pipe. All water main larger than 16 inches shall be ductile iron pipe (class 52).

- 5.1.2 All water laterals shall be a minimum of 1-1/4" (larger diameter may be required if deemed necessary) Type K one piece (non-jointed) seamless copper tubing and shall conform to ASTM designation B-88. Plastic pressure class 200 HDPE tubing conforming to the requirements of AWWA C901 and ASTM D2737 shall also be allowed. Service pipe shall have a SDR of 9 and shall have outside diameter dimensions of copper. Coupling and fittings shall be compression type, insert stiffeners for plastic tubing shall be AISI type 304 stainless steel. All laterals shall include a corporation stop, a curb stop and a 3" cast iron service box at the property line. Pipe saddles will be required for pipe taps over 1 inch in PVC pipe. All saddles shall be blue coated and have two stainless steel bans. A minimum of 6' of cover shall be maintained on all water laterals. Backfill materials and methods shall be identical to that specified for the main sewer and waterlines. A maple heart shall be installed extending a minimum of 3 feet above grade; the top foot to be painted orange upon completion of lateral installation.
- 5.1.3 All corporation stops are to be Ford FB 1000-45 for 1" and, FB 1000-55 for 1-1/4" or approved equivalent. All curb stops shall be Ford or a seal curb valve No. B-44-555M or approved equivalent. All curb boxes for services shall be Mueller H-10388 or approved equivalent. These boxes shall be set to grade with adjustment at mid-range. Curb boxes shall then be adjusted to finish grade after topsoil is installed.
- 5.1.4 Trench insulation where specified or required by shallow cover shall consist of 2' x 8' x 2" thick planks of Styrofoam plastic foam (Dow Chemical Company Hybrand or approved equivalent).
- 5.1.5 All water main trenches located in a proposed roadway shall be backfilled with one inch clear stone. If approved by the City Engineer in writing, Granular Backfill as described in Table 37, Sec. 8.43.8 of the Standard Specifications. Flooding of granular backfilled trenches shall not be permitted between October 1 and April 15 or if the air temperature is below 32° or if there is frost in the ground. If the water main is to be located in an off-road easement area, the spoil backfill shall be mechanically compacted. The cover material over the water main pipe shall be 12" and care shall be taken not to exert undue stress on the pipe during any compaction

operation. No frozen spoil material will be allowed for backfill material. During the mechanical compaction of granular material, the first compacted lift shall be 18". The contract shall use smaller lifts if the required compaction cannot be obtained. Granular material shall be compacted to 95% of the modified proctor density. Open graded, washed crushed stone may be allowed with permission of City Engineer.

- 5.1.6 The material used to backfill water main or water laterals repair trenches located in an existing roadway shall be an aggregate slurry backfill conforming to Section 8.43.8 of the Standard Specifications of Sewer and Water Construction in Wisconsin, Fifth Edition, March 1, 1988.
- 5.1.7 During water main installation a watertight plug shall be installed in the open end(s) between each pipe installation and at the end of each work period.
- 5.1.8 Sand bedding shall be required on all water main installations. An exception is in areas around valves and hydrants where graded stone is required.
- 5.1.9 Hydrants shall be installed on all water main ends that have service connections.
- 5.1.10 Contractor shall obtain a permit from the Franklin Water Utility for the use of water for the purpose of flushing trenches or obtaining safe water samples. The cost of such water shall be billed to the contractor based on metered use or upon approval, a volume based on three (3) times the total water main on the project. All existing water utility valves shall be operated by Franklin Utility personnel only.
- 5.1.11 Should water main be placed in a casing pipe, approved casing spacer system shall be used. RACI spacers or approved equal shall be required.

5.2 VALVES

- 5.2.1 All gate valves body casting shall be ductile iron or cast iron. All underground trim (nuts, bolts, etc.) for valves shall be stainless steel. All gate valves shall have non-rising stems, turn left (counter clockwise) to open, have a 2" square operating nut and be constructed for a working pressure of 200 p.s.i. unless otherwise directed in writing by the City Engineer. All 6" through 12" gate valves shall be resilient seated, conform to A.W.W.A. C509-80, and have stems sealed by at least two O-rings. All valves 16" and larger shall be of butterfly-type.
- 5.2.2 Unless otherwise noted on the plans, all valve boxes shall be size DD, three piece screw type box with Number Six base, as manufactured by Tyler and shall be U.S. manufactured or equal. Plastic valve box

assemblies will not be allowed. Top section shall be threaded to receive screw on type riser. Covers shall be 5¾" diameter and be marked "WATER", and shall be of the Stay Put type.

5.2.3 Valve boxes shall be set truly vertical and so supported until sufficient backfill has been placed to insure the vertical alignment of the box. All boxes shall be supported by valve box adapters.

5.2.4. Valve boxes shall be set 2-1/4" below finished pavement grade (binder grade) until final lift of asphalt is completed. Top section shall be set to midpoint relative to the top of lower section. No ramping will be allowed. Screw type risers shall be adjusted to accommodate final lift of asphalt.

5.2.5 All valves on stub ends shall be restrained with Mega-Lugs and shall be placed up stream of valve. All stub ends shall be extended one full pipe length.

5.3 FITTINGS

5.3.1 All fittings and their installation shall conform to all appropriate requirements of Part IV of the Standard Specifications. All fittings shall be jointed by a means of a compression type push on rubber gasket.

5.3.2 All fittings shall be cement-lined ductile iron, no lighter than Class D, A.W.W.A. Specifications designed for a service pressure of 150 p.s.i. Anchor tees or elbows may be mechanical joint. All other fittings may be mechanical joint as approved by City Engineer.

5.3.3 Mechanical joints shall be made with Cor-Blue nuts and bolts, which conform to C-111, A.W.W.A. Specifications.

5.3.4 Solid plugs or tapped test plugs shall be furnished as specified on the plans and shall be either rubber joint or mechanical joint, as required. Plugs furnished for rubber joint connections must have at least three (3) ductile iron retainer dogs.

5.3.5 Any non-stainless anchor fittings or rods shall be sprayed or coated with a rubberized or tar based sealant to prevent corrosion.

5.3.6 All fittings using a mechanical joint shall use a Mega lug type joint restraint system.

5.4 MARKERS

5.4.1 Detectable diggers caution tape shall be placed directly over and along the entire length of all water main located in easement areas. This tape shall be placed 24" below finished ground grade and shall be

blue in color and marked "Caution: Buried Water Below" (i.e. Terra Tape "D" Line guard, or equivalent). Tracer wire, coated 10 gauge, shall be placed along the top of mains and laid along the entire length of all water main including hydrant extensions. Wire shall be taped to the main every 50 feet (3 pipe lengths). Wire shall extend to and from the surface on the outside of hydrants in grassed areas through a 2" PVC pipe, to an inch above surface, as shown in Figure No. 22. **The contractor is required to do a conductivity test in the presence of the City of Franklin Water Department.**

Conductivity clamps will be installed on all tracer wire ends. Wire shall extend to and from the surface typically on the outside of hydrants in grassed areas to within one inch of surface through an access box, manufactured by Valvco, or approved equal. **See Figure 22.**

5.5 HYDRANTS

5.5.1 All hydrants shall be one of the following: Mueller Centurion Super A423 or Waterous Pacer. All hydrants are to be break flange type. Hydrants shall have one 4-1/2", and two 2-1/2" nozzles. All hydrants shall be furnished with hydrant underground trim shall be stainless steel an o-ring, stuffing boxes, shall have bronze to bronze fittings and shall open counter clockwise and be painted bright red. Hydrants shall have a 5-1/4" main valve opening and a 1-1/2" pentagon operating nut and on nozzle caps. Hydrants shall have a minimum of one cubic yard of 1" washed stone placed below the hydrant up to a point 6" above the hydrant drain hole. The 4-1/2" nozzle shall be horizontal and oriented toward the pavement. Hydrants normally shall be placed 4-1/2 feet behind of the back of curb.

5.5.2 All metal pipe and fitting shall be double polyethylene wrapped, meeting the requirements of Chapter 8.21.0 of the standard specifications for sewer and water construction. Installation of the wrap shall conform to Section 4.4.4.

5.5.3 All hydrant tees shall be Clow F012117 mechanical joint anchor tee with valve or approved equivalent. Hydrant leads shall be CL200 PVC and all joints shall be restrained with mega lugs **per manufacturer's recommendations.**

5.5.4 All hydrants shall be located at property line intersections and meet the following location requirements:

At the end of cul-de-sacs.

As near to all high points of the system as possible

At a 400' interval for residential areas

At a 300' interval for commercial and industrial areas

Near all roadway intersections

- 5.5.5 All hydrant nozzle elevations shall be located 18" - 24" above finished grade or top of curb. Break-away flange shall be just above finished grade. If extensions are added, breakaway coupling shall be set at break flange.
- 5.5.6 Specify exact hydrant lengths where possible. Use extensions only when necessary. Hydrant extensions, ("spools") when called for on plans, shall be used to accommodate the future lowering of street grade.
- 5.5.7 Hydrant "FLEX STAKE" (or equal) markers, red, 4 feet high with reflectorized log shall be installed facing traffic on each hydrant.
- 5.5.8 Where a hydrant with lead crosses a roadside ditch, a paved access ramp with an appropriate size culvert shall be installed. This ramp shall be six (6) feet wide and extend from edge of street pavement to two (2) feet beyond the back of hydrant. The ramp shall be constructed of three (3) inches of asphalt on a minimum of six (6) inches of crushed stone.

5.6 CONNECTION TO EXISTING MAINS

- 5.6.1 Water main construction shall be free standing until approved unless existing conditions warrant testing after wet connection is made. This determination will be made by the Franklin Water Department staff. In this case the contractor will install an appropriate size valve before the connection to existing system, assuring the test will be made against a new valve.

All connections to the existing City water mains shall be made under full water service pressure. Connection can be made only after safe water and pressure test reports have been approved by the City. A City of Franklin Water Utility representative shall be present at the time of connection.

5.7 TESTING

- 5.7.1 All water main and laterals shall be tested in full accordance with the requirements of Chapter 4.15.0 and Section 5.5.18 of the Standard Specifications for Sewer and Water Construction, latest edition.